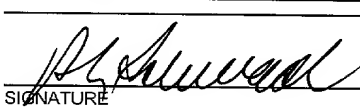


FORM PTO-1390 (Modified) (REV 5-93)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				016906-0222	
				U.S. APPLICATION NO. (If known, enter 371 or 372) Unknown	
INTERNATIONAL APPLICATION NO. PCT/EP00/01681		INTERNATIONAL FILING DATE February 29, 2000		PRIORITY DATE CLAIMED March 15, 1999	
TITLE OF INVENTION COLLECTOR TUBE FOR A HEAT TRANSFER UNIT AND METHOD FOR PRODUCING SAME					
APPLICANT(S) FOR DO/EO/US Karl-Heinz STAFFA, Hans-Joachim KRAUSS, Hagen MITTELSTRASS, Christoph WALTER, and Bernd DIENHART					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
1	<input checked="" type="checkbox"/>	This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.			
2	<input type="checkbox"/>	This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.			
3	<input type="checkbox"/>	This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).			
4	<input checked="" type="checkbox"/>	A proper Demand for International Preliminary Examination was made by the 19 th month from the earliest claimed priority date.			
5	<input checked="" type="checkbox"/>	A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <input type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). <input checked="" type="checkbox"/> has been transmitted by the International Bureau. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US)			
6	<input checked="" type="checkbox"/>	A translation of the International Application into English (35 U.S.C. 371(c)(2)).			
7	<input checked="" type="checkbox"/>	Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). <input type="checkbox"/> have been transmitted by the International Bureau. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. <input checked="" type="checkbox"/> have not been made and will not be made.			
8	<input type="checkbox"/>	A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).			
9	<input type="checkbox"/>	An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).			
10	<input checked="" type="checkbox"/>	A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).			
11	<input type="checkbox"/>	Applicant claims small entity status under 37 CFR 1.27.			
Items 12. to 17. below concern other document(s) or information included:					
12	<input checked="" type="checkbox"/>	An Information Disclosure Statement under 37 CFR 1.97 and 1.98.			
13	<input type="checkbox"/>	An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.			
14	<input checked="" type="checkbox"/>	A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.			
15	<input type="checkbox"/>	A substitute specification.			
16	<input type="checkbox"/>	A change of power of attorney and/or address letter.			
17	<input type="checkbox"/>	Other items or information:			

09/936567

U.S. APPLICATION NO. (if known, see 37 CFR 1.50) Unassigned 09/936567		INTERNATIONAL APPLICATION NO. PCT/EP00/01681		ATTORNEY'S DOCKET NUMBER 016906-0222	
18. <input checked="" type="checkbox"/> The following fees are submitted:				CALCULATIONS	
Basic National Fee (37 CFR 1.492(a)(1)-(5): Search Report has been prepared by the EPO or JPO.....\$860.00					
International preliminary examination fee paid to USPTO (37 CFR 1.482).....\$690.00					
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2))\$710.00					
Neither international preliminary examination fee (37 CFR 1.482) nor International search fee (37 CFR 1.445(a)(2)) paid to USPTO \$1,000.00					
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)\$100.00					
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$860.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than 20 Months from the earliest claimed priority date (37 CFR 1.492(e))				\$130.00	
Claims	Number Filed	Included in Basic Fee	Extra Claims	Rate	
Total Claims	10	- 20	= 0	x \$18.00	\$0.00
Independent Claims	2	- 3	= 0	x \$80.00	\$0.00
Multiple dependent claim(s) (if applicable)				\$270.00	
TOTAL OF ABOVE CALCULATIONS =				\$990.00	
Reduction by 1/2 for filing by small entity, if applicable.				\$0.00	
SUBTOTAL =				\$990.00	
Processing fee of \$130.00 for furnishing English translation later the 20 Months from the earliest claimed priority date (37 CFR 1.492(f)).				+	
TOTAL NATIONAL FEE =				\$990.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +					
TOTAL FEES ENCLOSED =				\$990.00	
				Amount to be: refunded \$	
				charged \$	
a. <input checked="" type="checkbox"/> A check in the amount of \$990.00 to cover the above fees is enclosed.					
b. <input type="checkbox"/> Please charge my Deposit Account No. <u>19-0741</u> in the amount of \$0.00 to the above fees. A duplicate copy of this sheet is enclosed.					
c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>19-0741</u> . A duplicate copy of this sheet is enclosed.					
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO:					
Foley & Lardner Washington Harbour 3000 K Street, N.W., Suite 500 Washington, D.C. 20007-5109			 SIGNATURE NAME RICHARD L. SCHWAAB REGISTRATION NUMBER 25,479		

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No. 016906-0222

In re patent application of

Karl-Heinz STAFFA et al.

Serial No. Unassigned

Filed: September 14, 2001

For: COLLECTOR TUBE FOR A HEAT TRANSFER UNIT AND METHOD FOR
PRODUCING SAME

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application, Applicant respectfully
request that the following amendment be entered into the application:

IN THE CLAIMS:

Please amend claims 3 and 7 as submitted with the English translation of the annex
of the International Preliminary Examination Report as follows:

--3. (Amended) Header tube according to Claim 1, further characterized in
that the ratio (D/D1) of the tube outside diameter (D) outside the slot regions to the tube
transverse extent (D1) in the slot regions is between 1.02 and 1.5.

7. (Amended) Method according to Claim 4, further characterized in that
punctiform heat treatment and/or mechanical weakening is provided at the points at which
the slot or slats (3a) to (3d) are to be introduced.--

Please add new claims 8 through 10 as follows:

-- 8. (New) Header tube according to Claim 2, further characterized in that the ratio (D/D1) of the tube outside diameter (D) outside the slot regions to the tube transverse extent (D1) in the slot regions is between 1.02 and 1.5.

9. (New) Method according to Claim 5, further characterized in that punctiform heat treatment and/or mechanical weakening is provided at the points at which the slot or slats (3a) to (3d) are to be introduced.


10. (New) Method according to Claim 6, further characterized in that punctiform heat treatment and/or mechanical weakening is provided at the points at which the slot or slats (3a) to (3d) are to be introduced.--

REMARKS

Applicant respectfully request that the foregoing amendments to Claims 3 and 7 and new Claims 8 through 10 be entered in order to avoid this application incurring a surcharge for the presence of one or more multiple dependent claims. A mark-up version of the claims as amended is attached herewith.

Respectfully submitted,

September 14, 2001
Date



Richard L. Schwaab
Registration No. 25,479

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VERSIONS WITH MARKINGS TO SHOW CHANGES MADE

3. Header tube according to Claim 1[or 2], further characterized in that the ratio (D/D_1) of the tube outside diameter (D) outside the slot regions to the tube transverse extent (D_1) in the slot regions is between 1.02 and 1.5.

7. Method according to [one of]Claim[s] 4[to 6], further characterized in that punctiform heat treatment and/or mechanical weakening is provided at the points at which the slot or slats (3a) to (3d) are to be introduced.

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PCT/EP00/01681

Header tube for a heat exchanger and method for the
production of same

The invention relates to a header tube for a heat exchanger, with one or more slots for the insertion of a respective flat tube, said slots being introduced by punching with no inner die or by internal high-pressure forming, and to a method for the production of a header tube of this type. An important field of use is heat exchangers in the form of evaporators and condensers or gas coolers of motor vehicle air-conditioning systems.

Patent Specifications EP 0 198 581 B1 and US 5,052,480 disclose header tubes, each with a row of transverse slots, into which are inserted flat-tube ends of a heat exchanger block constructed from flat tubes arranged in parallel. Due to the transverse position of the slots, the header tube diameter must be kept larger than the slot length. The header tubes have a tube-wall thickness which is smaller by a multiple than their diameter. Due, inter alia, to this small tube-wall thickness, as regards the header tubes of EP 0 198 581 B1, indentations of the header tube occur in the regions of the slots and form inwardly bent intrusions, the tube outside diameter being about one and a half times larger outside the slot region than in

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the slot region.

In a header tube production method described in the laid-open publication DE 43 34 203 A1, transverse slots in the form of inwardly bent intrusions are introduced into a header tube by punching assisted by an inner die, for which purpose an inner die is pushed into the header tube and the slots are punched into the header tube wall from outside by means of a suitable ram.

Alternatively to transverse slots, it is known to provide header tubes with slots which run parallel to or at an acute angle to the tube longitudinal axis and into which twisted flat-tube ends are inserted, see for example, Patent Specification US 3,416,600 and the laid-open publications EP 0 845 648 A2 and DE 197 29 497 A1.

The technical problem on which the invention is based is to provide a header tube of the type mentioned in the introduction, which can be produced at relatively low outlay and is also suitable, in particular, for applications involving a high pressure load, such as for CO₂ air conditioning systems of motor vehicles, and an advantageous method for the production of such a header tube.

The invention solves this problem by the provision of a header tube having the features of Claim 1 and of a method for header tube production having the features of Claim 4 or 5.

In the header tube according to Claim 1, the ratio of the tube outer radius to the tube-wall thickness has a value lower than five, that is to say, with respect to its tube outer radius, the header tube has a comparatively large tube-wall thickness which makes it suitable for applications involving a high pressure load, such as occur, for example, in motor vehicle air-conditioning systems which operate with CO₂ as refrigerant. In particular, tube-wall thicknesses of between 1.8 mm and 2.5 mm may be provided. The header tube with this large tube-wall thickness can be provided at relatively low outlay, by punching with no inner die or by internal high-pressure forming, with elongate slots, into which associated flat-tube ends of a heat exchanger can be inserted and can be sealingly soldered or secured in a gastight manner in another way.

In an advantageous development of the invention, according to Claim 2 a material with a hardness of between 35 H_v and 80 H_v is selected for the header tube.

In a further refinement of the invention, according to Claim 3, the slots are formed by inwardly bent intrusions, in such a way that the ratio of the tube outside diameter outside the slot region to that in the slot region is between 1.02 and 1.5.

In the header tube production method according to Claim 4, one or more slots are introduced into the header tube by punching with no inner die or by internal high-pressure forming and are oriented parallel to or at an acute angle to the header tube longitudinal axis. A header tube produced in this way is particularly suitable for heat exchangers, in which use is made of flat tubes with twisted ends which, as a result of the twisting, are oriented at a corresponding angle to the header tube longitudinal axis.

In the header tube production method according to Claim 5, in order to form the header tube, first a flat piece, which may be solder-plated, if required, is bent into a blank, the longitudinal gap which has thereby remained being subsequently sealingly soldered or sealingly welded. The slots required for the insertion of heat exchanger flat tubes are introduced, by punching with no inner die, selectively either already into the flat piece or only into the blank bent out of the flat piece, before or after the longitudinal gap is

sealingly soldered or sealingly welded.

In a further refinement of this production method, according to Claim 6, a solder-plated flat piece is used so that a correspondingly solder-plated header tube is then obtained, thus making it easier for the longitudinal gap and/or flat-tube ends inserted into the slots to be sealingly soldered. In a further refinement of this measure, according to Claim 7, the seal-soldering of the longitudinal gap is carried out in a common soldering operation, in which the remaining components of the heat exchanger are simultaneously soldered together, so that, overall, only one complete soldering operation is necessary for the manufacture of the heat exchanger.

In a further refinement of the header tube production method according to the invention, according to Claim 8 punctiform heat treatment and/or mechanical weakening is provided at the points on the header tube at which the slots are to be introduced, thus making it easier for the slots to be introduced with no inner die.

Advantageous embodiments of the invention are illustrated in the drawings and are described below.

In the drawings:

Figure 1 shows a diagrammatic side view of a detail of a header tube with slots introduced parallel to the tube longitudinal axis,

Figure 2 shows a sectional view along the line II-II of Figure 1,

Figure 3 shows a top view of a detail of a flat piece which can be used for producing the header tube of Figure 1,

Figure 4 shows a side view of the header tube blank obtained by bending round the flat piece of Figure 3,

Figure 5 shows a side view of a detail of a header tube with two slots lying circumferentially in contact next to one another, and

Figure 6 shows a cross-sectional view of a header tube with two separate longitudinal header ducts.

The header tube 1 shown as a detail in Figures 1 and 2 is provided circumferentially, that is to say on its tube outer surface, with a row of slots 3a, 3b, 3c, 3d, 3e, 3f which succeed one another in the direction of the tube longitudinal axis 2 and have an elongate

configuration matched to the cross-sectional shape of flat-tube ends to be inserted. Said slots run with their longitudinal extent parallel to the tube longitudinal axis or tube outer surface line 2 and succeed one another at equal short intervals so as to form corresponding web regions 4a, 4b, 4c, 4d, 4e. It goes without saying that, if required, that is to say depending on the succession of flat-tube ends to be inserted of a heat exchanger flat-tube block configuration used in each case, any other succession of slots is possible, for example, a sequence of pairs of slots having a wider interval and each consisting of two closely adjacent slots.

The slots 3a to 3f can be introduced by means of a punching operation, in which the header tube 1 is surrounded by an outer die divided in two, the lower die half of which carries the header tube 1 and the upper die half of which has a corresponding number of slots which are arranged at intervals and through which associated punching rams penetrate and thereby "tear" the slots 3a to 3f into the header tube 1 as inwardly directed intrusions. Alternatively, the introduction of the slots may also be carried out partially by means of suitable rams and also with the header tube 1 being guided only partially on the outer circumference. As can be seen in more detail from Figure 2, owing to the

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inwardly bent-round intruded slots 3a to 3f, the header tube 1 has in the respective slot region a tube outside diameter D_1 which is smaller than the tube outside diameter D outside the slot regions, that is to say level with the webs 4a, 4b, 4c. The term "outside diameter" is in this case to be understood in the wide sense as designating in general the transverse extent, even in the case of noncircular cross-sectional shapes. It is shown that the "tearing" or punching of the slots 3a to 3f should preferably be carried out in such a way that the ratio of the tube outside diameter D outside the slot regions to the tube outside diameter D_1 in the slot regions is between about 1.02 and about 1.5. The introduction of the slots 3a to 3f may be influenced or facilitated by the header tube 1 previously being heat-treated in a punctiform manner at the respective points or by mechanical weakening of the tube wall being provided at these points. As a further alternative manufacturing method, the slots may also be introduced by means of internal high-pressure punching.

As is also evident from Figure 2, the header tube 1 has a relatively large wall thickness s in relation to its diameter D , so that it is also suitable for applications involving a high pressure load. The header tube 1 can therefore also be used, in particular, for heat exchangers such as evaporators and gas coolers, of

CO₂ air-conditioning systems which are increasingly provided for use in motor vehicles. The tube-wall thickness s is typically larger than 1.0 mm and is preferably in the range of between about 1.3 mm and 2.5 mm. With respect to the tube outside diameter D or to the tube radius $D/2$, it proves advantageous if the ratio $D/2s$ or the tube radius $D/2$ to the tube-wall thickness s is kept lower than five and is preferably between about two and five. Furthermore, it proves beneficial to select a material for the header tube with a material hardness of between about 35 H_v and about 80 H_v, in particular for use in a heat exchanger of a CO₂ air-conditioning system.

Associated flat-tube ends, in particular flat-tube ends twisted through 90°, may be inserted into the slots 3a to 3f in a way known per se and be connected in a gastight manner. For this purpose, the slots 3a to 3f may be provided with suitable tube introduction slopes, thus making it easier to receive a gastight connection by means of a subsequent seal soldering operation. For seal-soldering, the header tube may be solder-plated or suitable solder preforms may be used. The prior solder-plating of the header tube may be carried out according to a current plating method or else by means of a CD method or by galvanizing. Alternatively, the slots introduced into the header tube may also be introduced

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into the header tube without an inwardly directed intrusion region and without introduction sloping. Depending on the tube-wall thickness and tube strength and on the moment of resistance during the introduction of the slots 3a to 3f, a more or less pronounced deformation forming an intrusion is formed parallel to the tube extent and, due to its trough shape, keeps the solder in the region to be soldered, when the flat-tube ends inserted into the slots 3a to 3f are being sealingly soldered. The seal-soldering of the inserted flat tube ends may be carried out in a single soldering operation in which, at the same time, the entire construction, for example a tube/rib block construction and the associated exchanger is soldered together. By means of this manufacturing method, both flat tube condensers or flat tube gas coolers and evaporators of given types can be produced, for example those with a block consisting of rectilinear or of serpentine flat tubes. Suitable header tubes of the present type are then in each case arranged laterally on the block in order to distribute the refrigerant of the air-conditioning system to the flat tubes and to collect it from the flat tubes.

The header tube 1 may be manufactured, as an initially unplated header tube blank, by drawing and subsequent optional plating. Another manufacturing method is

illustrated in Figures 3 and 4. In this type of production, the flat tube 1 is manufactured from a flat material 5, which, if desired, may already be solder-plated. As illustrated in Figure 3 by bending arrow B, the flat piece 5 is bent parallel to its longitudinal axis 5a into a round-tube blank, shown in Figure 4. As is also evident from Figure 4, where the round-tube blank 6 is concerned, the two previous flat-piece longitudinal sides 7a, 7b are located opposite one another so as to form a narrow longitudinal gap 8. The longitudinal gap 8 is then closed in a gastight manner by welding or soldering in a subsequent manufacturing step. The seal-soldering of the longitudinal gap 8 is carried out by means of flux in a special soldering operation or in a common operation together with the seal-soldering of flat-tube ends which are inserted into slots in the blank 6 functioning in the finished state as a header tube. In particular, a single complete soldering operation may be provided, in which the soldered connections and also all the other soldered connections of the components necessary for constructing a corresponding heat exchanger are made. The insertion slots for the flat-tube ends may, depending on the application, be introduced already into the flat piece 5 or only into the round-tube blank 6 before or after the gastight closing of the longitudinal gap 8. In this case, the row of slots, as

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is shown in Figure 1 is preferably located diametrically opposite the longitudinal gap 8.

Instead of the row, shown in Figure 1, of slots introduced in the tube longitudinal direction and in a longitudinal mid-plane of the header tube 1, the elongate slots required for the insertion of flat-tube ends may also be introduced in another way, for example as eccentric slots, which are introduced, offset laterally to the longitudinal mid-plane or outer surface line of the header tube or as inclined slots, which are introduced, inclined at an angle of more than 0° and less than 90° to the tube outer surface line or longitudinal mid-plane of the header tube. By the tube ends thereby issuing into the header tube not transversely to the tube longitudinal direction, but parallel to or at an inclination to the latter, the inside diameter of said header tube can be kept smaller than the flat-tube width. This is conducive to the stability of the header tube under pressure and, as compared with flat tubes entering transversely, makes it possible to have a reduction in volume of the header tube and consequently of the refrigerant quantity necessary for the air-conditioning system.

A further variant is illustrated in Figure 5. In the header tube 9 shown as a detail there, two

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circumferentially adjacent slots 11a, 11b are provided, which are combined to form a corresponding double slot in that they are longitudinally in contact with one another along the tube outer surface line 10. Two flat-tube ends lying closely against one another can be inserted into this double slot in a gastight manner. As a further alternative slot configuration, a row of slots similar to that of Figure 1 is provided, in which, however, the slots are not arranged at intervals from one another but butt with their narrow sides against one another.

Apart from the circular cross section, other header tube cross sections are also possible, depending on the application, for example a rectangular or square, semicircular or oval cross section. Moreover, the header tube according to the invention can be implemented not only as a single-chamber tube that is to say with a single distributing or collecting space, but also as a multichamber tube. Thus, Figure 6 shows as an example a two-chamber tube 12 which contains two longitudinal ducts 13a, 13b separated from one another. Two rows of slots 14, 15 lying next to one another are introduced into the two-chamber tube 12, each row of slots being configured according to that of Figure 1 or one of the variants mentioned above in this respect and issuing in each case into one of the two longitudinal

ducts 13a, 13b.

As a further embodiment of the invention, a header tube may be provided, the tube interior of which is divided by one or more transverse partitions into a plurality of collecting spaces which succeed one another in the tube longitudinal direction and into which issue in each case one or more flat-tube ends which are inserted sealingly into associated header tube slots.

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New patent claims

1. Header tube for a heat exchanger, with
- one or more slots (3a to 3d) for the insertion of a respective flat tube, said slots being introduced by punching with no inner die or by internal high-pressure forming, characterized in that
 - the ratio $(D/2s)$ of the tube outer radius $(D/2)$ to the tube-wall thickness (s) is lower than five.
2. Header tube according to Claim 1, further characterized in that the hardness of the material used for the header tube is between 35 HV and 80 HV.
3. Header tube according to Claim 1 or 2, further characterized in that the ratio $(D/D1)$ of the tube outside diameter (D) outside the slot regions to the tube transverse extent $(D1)$ in the slot regions is between 1.02 and 1.5.
4. Method for the production of a header tube with

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one or more slots for a heat exchanger, said slots being introduced by punching with no inner die or by internal high-pressure forming, characterized in that

- a flat piece (5) is bent into a header tube blank open along a longitudinal gap (8) and the longitudinal gap is subsequently sealingly soldered or sealingly welded, and
- the slot or slots (3a to 3d) are introduced into the header tube blank (6) after the longitudinal gap (8) is sealingly soldered or sealingly welded.

5. Method according to Claim 4, further characterized in that a solder-plated flat material is used as the flat piece (5).
6. Method according to Claim 5, further characterized in that the seal-soldering of the longitudinal gap (8) is carried out in a single soldering operation for the production of an associated heat exchanger, in which operation all the other soldered connections for constructing the heat exchanger are also made.

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7. Method according to one of Claims 4 to 6, further characterized in that punctiform heat treatment and/or mechanical weakening is provided at the points at which the slot or slots (3a) [sic] to 3d) are to be introduced.

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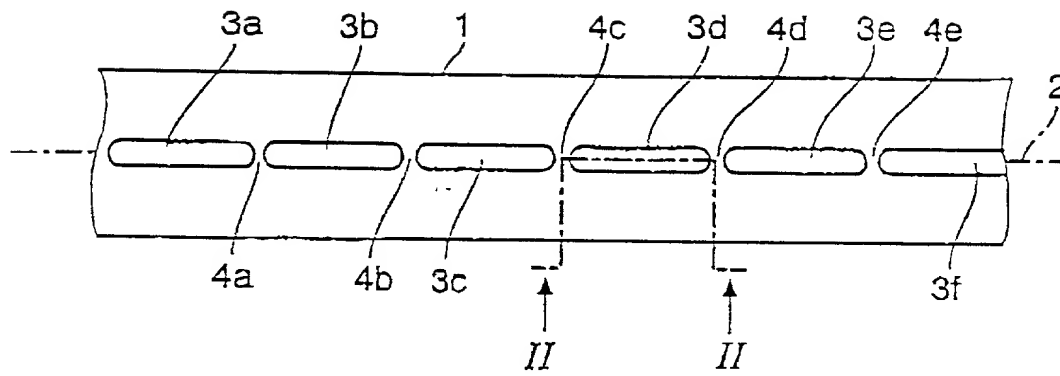


Fig. 1

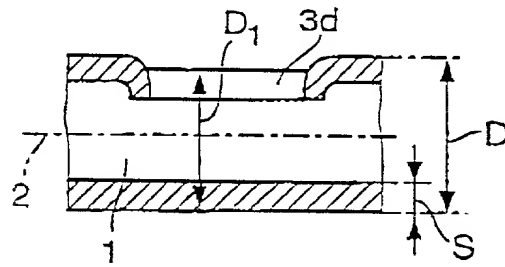


Fig. 2

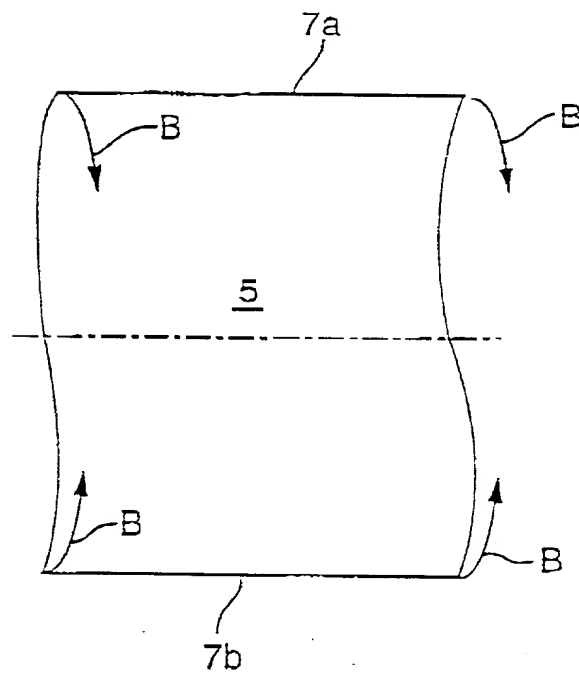


Fig. 3

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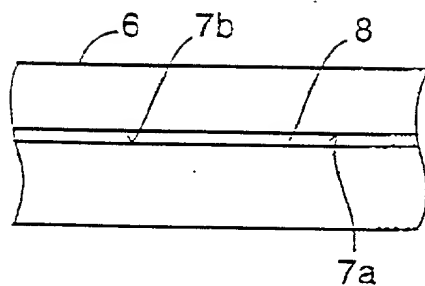


Fig. 4

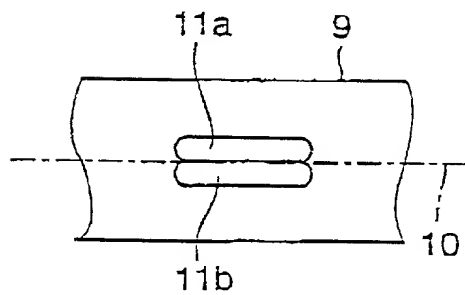


Fig. 5

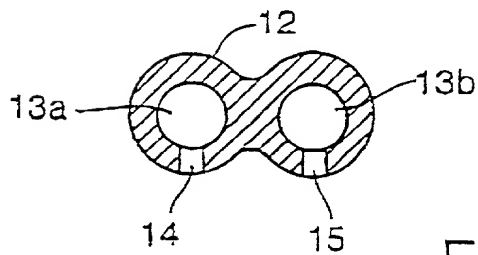


Fig. 6

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DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I HEREBY DECLARE:

THAT my residence, post office address, and citizenship are as stated below next to my name;

THAT I believe I am the original, first, and sole inventor (if only one inventor is named below) or an original, first, and joint inventor (if plural inventors are named below or in an attached Declaration) of the subject matter which is claimed and for which a patent is sought on the invention entitled

COLLECTOR TUBE FOR A HEAT TRANSFER UNIT AND METHOD FOR PRODUCING SAME

(Attorney Docket No. 016906-0222)

the specification of which (check one)

 is attached hereto.

 X was filed on February 29, 2000 as United States Application Number or PCT International Application Number PCT/EP00/01681 and was amended on May 28, 2001 (if applicable).

THAT I do not know and do not believe that the same invention was ever known or used by others in the United States of America, or was patented or described in any printed publication in any country, before I (we) invented it;

THAT I do not know and do not believe that the same invention was patented or described in any printed publication in any country, or in public use or on sale in the United States of America, for more than one year prior to the filing date of this United States application;

THAT I do not know and do not believe that the same invention was first patented or made the subject of an inventor's certificate that issued in any country foreign to the United States of America before the filing date of this United States application if the foreign application was filed by me (us), or by my (our) legal representatives or assigns, more than twelve months (six months for design patents) prior to the filing date of this United States application;

THAT I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment specifically referred to above;

THAT I believe that the above-identified specification contains a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention, and sets forth the best mode contemplated by me of carrying out the invention; and

THAT I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I HEREBY CLAIM foreign priority benefits under Title 35, United States Code § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number	Country	Foreign Filing Date	Priority Claimed?	Certified Copy Attached?
199 11 334.3	Fed. Rep. of Germany	03/15/1999	YES	

I HEREBY CLAIM the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

U.S. Provisional Application Number	Filing Date

I HEREBY CLAIM the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application Number	PCT Parent Application Number	Parent Filing Date	Parent Patent Number

I HEREBY APPOINT the following registered attorneys and agents of the law firm of FOLEY & LARDNER:

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to have full power to prosecute this application and any continuations, divisions, reissues, and reexaminations thereof, to receive the patent, and to transact all business in the United States Patent and Trademark Office connected therewith.

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I UNDERSTAND AND AGREE THAT the foregoing attorneys and agents appointed by me to prosecute this application do not personally represent me or my legal interests, but instead represent the interests of the legal owner(s) of the invention described in this application.

I FURTHER DECLARE THAT all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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